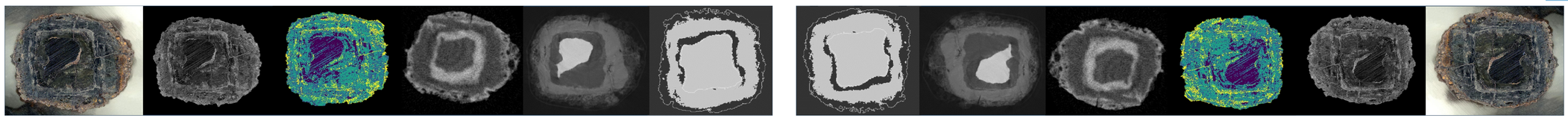

Corrosion in soil: investigation on archaeological iron artifacts

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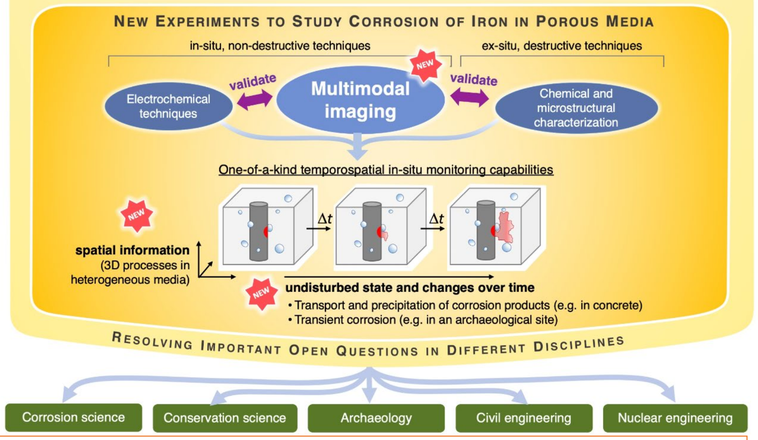
The project: CORINT

"Elucidating **Cor**rosion by **In**-situ **T**omography" aims to make a breakthrough in fundamental understanding of **iron corrosion process** occurring in **opaque porous media**.

- 6 Swiss partners: EPFL, ETHZ, PSI, HE-Arc CR, Nagra, SMRA
- 4 years: 2022-2026



Problem statement

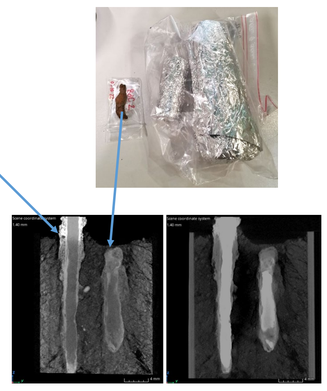
- Very **limited access** to observe corrosion phenomena happening inside opaque burial media, e.g., concrete, soil.
- Post-excavation, **traditional analytical techniques** usually involves **removal of burial medium** surrounding artifacts.
- Soil removal = artifacts are exposed to a new environment → **different** O_2 and H_2O concentration **before** vs. **after excavation.**
- New environment = new equilibrium → **corrosion products** may **transform** → (ir)relevant analyses results vs. as-buried condition?

Methodology

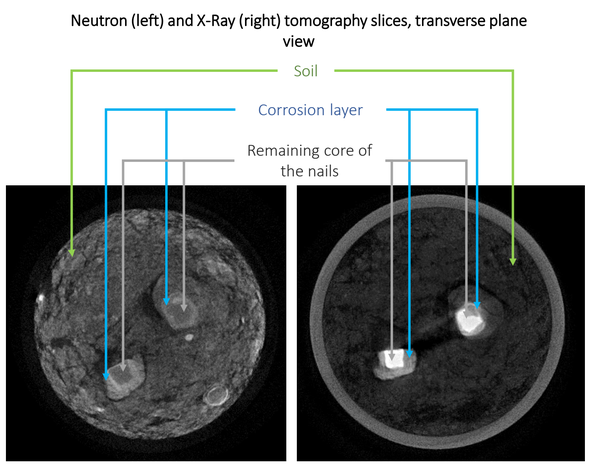
Combine Neutron and X-rays Computed Tomography (N&X-CT) imaging to characterize undisturbed archaeological iron artifacts still embedded in soil

Ad-hoc archaeological excavation

Samples seen with naked eyes

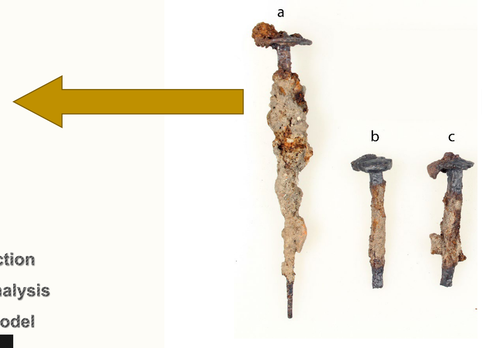


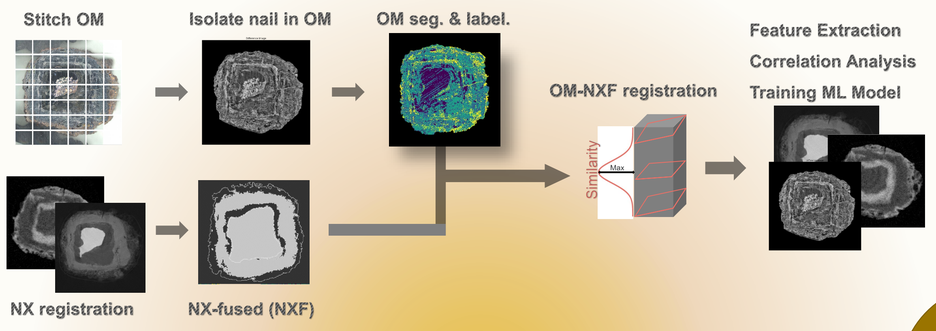
Neutron (left) and X-Ray (right) tomography slices, longitudinal plane view

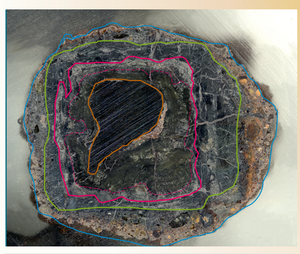


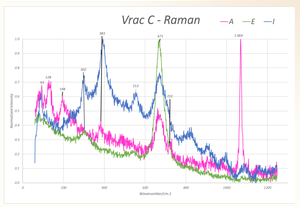
DATA INTERPRETATION: 2 parallel approaches

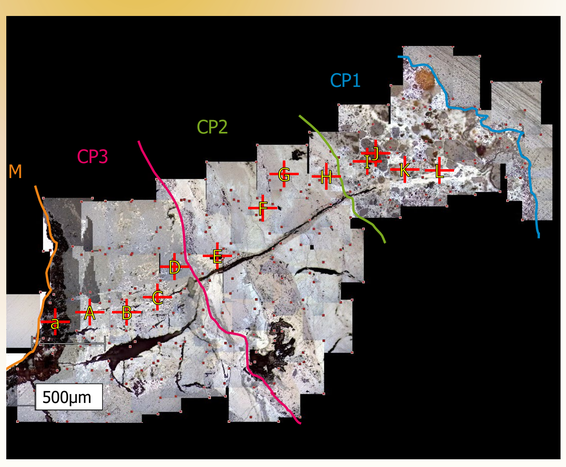
Combination of N&X-CT and ex-situ analyses on cross sections

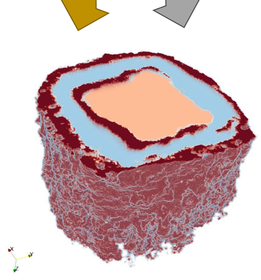






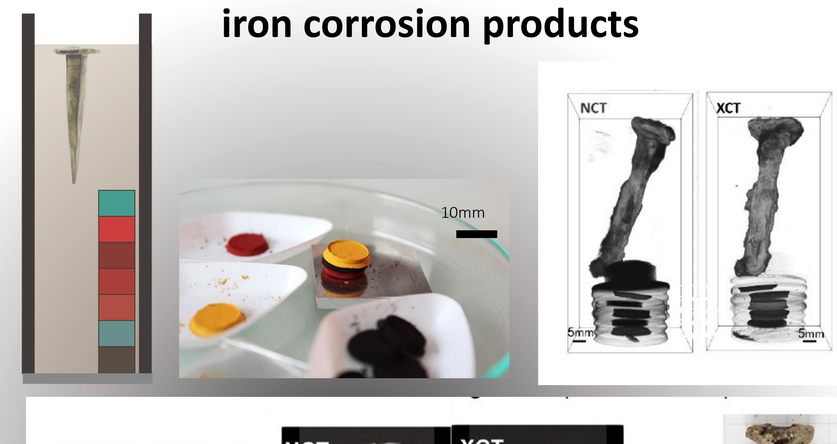


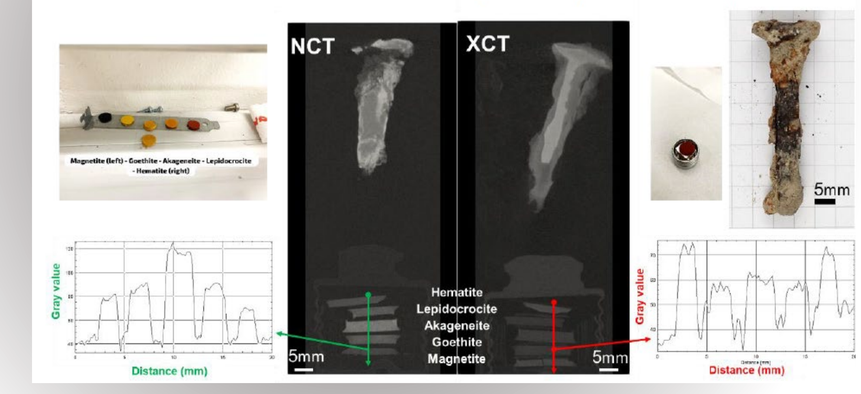




3D reconstruction and identification of different corrosion layers

«Calibration» of N&X-CT with standard iron corrosion products





This is an ongoing project, follow the progress on our website

https://corrosion-corint.ch/

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